

EXPOSURE CONTROL FOR PHASE SHIFTING PHOTOLITHOGRAPHIC MASKS

ABSTRACT

Mask and integrated circuit fabrication approaches are described to facilitate use of so
called "full phase" masks. This facilitates use of masks where substantially all of a layout is
defined using phase shifting. More specifically, exposure settings including relative dosing
between the phase shift mask and the trim masks are described. Additionally, single reticle
approaches for accommodating both masks are considered. In one embodiment, the phase
shifting mask and the trim mask are exposed using the same exposure conditions, except for
relative dosing. In another embodiment, the relative dosing between the phase and trim patterns
is $1.0:r$, $2.0 < r < 4.0$. These approaches facilitate better exposure profiles for the resulting ICs
and can thus improve chip yield and increase throughput by reducing the need to alter settings
and/or switch reticles between exposures.